has potential benefit as a basic educational tool for students and health professionals interested in exploring these analytical approaches.

CONCEPTUAL PAPERS & RESEARCH ON METHODS – Modeling Methods

PMC4

CHOOSING THE RIGHT DISTRIBUTION WHEN PERFORMING PROBABILISTIC SENSITIVITY ANALYSIS: RELATIVE RISKS AND THE TRIANGULAR DISTRIBUTION A SIMULATION STUDY

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OBJECTIVES: In economics the triangular distribution is often used when limited information is available for different parameters. This is also the case in health economic modeling when performing probabilistic sensitivity analysis (PSA). In PSA, distributions are assigned to input parameters in order to assess the uncertainty in the model. One of the main criticisms of PSA is that the distributions can be chosen arbitrarily. Analysts can thereby manipulate the choice of distributions to bias the results. This study investigates the usage of the triangular distribution for describing the uncertainty of relative risks (RR) compared to the lognormal distribution and empirical distribution RR generated through simulations. **METHODS:** Ten thousand simulations of the triangular distribution, the log normal distribution and relative risks constructed from two binomial distributions were performed. Descriptive statistics and graphical plots were constructed. **RESULTS:** The triangular distribution does not have the support of the full positive real axis and as such extreme values, such as very small and very large numbers, have a zero probability of being measured. However, values around the mode are prone to be drawn with a higher probability compared to both the exact values and the log normal distribution. The lognormal distribution tends to overestimate the RR compared to the empirical distribution. **CONCLUSIONS:** This study shows that the triangular distribution is a poor choice for characterizing the uncertainty of RR. The overestimation of the RR can introduce bias, for instance, if used for responder rates or death rates. The lognormal distribution appears to be a better approximation, but if the actual number of events and total number of exposed are available, the empirical simulation is of course preferred.

CONCEPTUAL PAPERS & RESEARCH ON METHODS – Patient-Reported Outcomes Studies

PMC6

ESTIMATING EQ-5D TARIFFS FOR MALAYSIA USING TIME TRADE OFF AND VISUAL ANALOGUE SCALE

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OBJECTIVES: This research aimed to estimate utility tariffs for Malaysia using Time Trade Off (TTO) and Visual Analogue Scale (VAS) valuations of the EQ-5D descriptive system. **METHODS:** TTO and VAS valuations were obtained from face to face surveys in 2004 and 2005 of 152 adult patients, their care-givers and health professionals at six government hospitals in Malaysia. The survey closely followed the methodology of EQ5D health states by Shaw et al. Forty-five EQ-5D health states were valued, divided into five sets of 15 health states each. Each respondent was asked to value one set of 15 health states. Each respondent performed a ranking, the VAS and TTO valuations. TTO allowed for scoring health states as worse than death. Linear additive regression models were performed. Dependent variables were the rescaled VAS and TTO values. Independent variables were two dummy variables for each of the five EQ-5D dimensions and two pre-defined interaction terms, N3 and D1. **RESULTS:** A total of 152 respondents were obtained with mean age 41 years and self-assessed VAS of 82. Respondents reported TTO valuations to be difficult or more difficult (16%) than VAS valuation (8%). A greater number of VAS valuations had no inconsistencies compared to TTO valuations (63% and 17% respectively). All N3 and D1 models were statistically significant. Goodness-of-fit was better in VAS models (adjusted R2 0.755 and 0.757) than N3 models (adjusted R2 0.424 and 0.412). All the independent variables in the models were statistically significant and theoretically consistent with expected signs and magnitude, with level 3 coefficients larger than level 2 coefficients for the same health dimension. **CONCLUSIONS:** Both N3 and D1 model specifications were applicable to Malaysian EQ-5D health valuations. VAS valuations appear to be better than TTO.

PMC7

TRANSLATING ITEM BANKS: BENEFITS AND CHALLENGES

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With the emergence of electronic data collection and efforts to reduce respondent burden, the use of item banks to measure health related constructs—especially within federally funded (NIH) research—has become more mainstream. Following the use and acceptance of Computer Adaptive Testing (CAT) in educational testing, item banks in health status assessment allow for better measurement of a construct across the measurement continuum. As with standard static questionnaires used in outcomes assessment, there is a need for multilingual translations of item banks in order to establish and compare item hierarchies across varying languages and cultures. Translation and validation of items contained in item banks presents interesting scientific opportunities for cross-cultural health assessment, but there are also attendant challenges to be addressed. This presentation will give a brief overview of the benefits of computer adaptive testing while outlining the most salient issues related to the evaluation of item difficulty and hierarchy. It will also highlight differences and unique challenges brought about by translating item banks. Topics such as maintaining consistent terminology, recall period and verb tense will be addressed and examples from our experience will be provided. Appropriate translation methodology, copyright issues and the role of both qualitative and quantitative data in the process will also be discussed as well as brief examples of how items that are similar linguistically and conceptually may have different item parameters in different languages.

PMC8

PREDICTING THE SF-6D PREFERENCE-BASED INDEX SCORE USING THE SF-8 HEALTH SURVEY

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OBJECTIVES: This study aimed to develop a function to predict the SF-6D index score from SF-8 scores. **METHODS:** This study was a secondary analysis of data collected in a population health survey in Singapore in which respondents (n = 7529) completed both the SF-36 and the SF-8 questionnaires. Four multiple linear regression models with different specifications were compared for their performance in predicting SF-6D scores calculated using responses to SF-8 items. **RESULTS:** The model in which responses to all SF-8 items were coded into dummy variables achieved the best prediction outcomes. The model explained 62% (other models: 56% to 62%) of the variance in the SF-6D index score with the mean absolute error being 0.056 (other models: 0.056 to 0.06100) and root mean square error being 0.076 (other models: 0.077 to 0.083). The absolute error between predicted and observed SF-6D scores was less than 0.1 and 0.05 among 84% and 59% of the respondents, respectively; this results for other modes were 77% to 84% and 51% to 56%. **CONCLUSIONS:** It is possible to generate a utility-based index score from the SF-8. The function developed in this study should be further tested in other populations.

CONCEPTUAL PAPERS & RESEARCH ON METHODS – Statistical Methods

PMC10

NONPARAMETRIC METHODS FOR VALUE OF INFORMATION ANALYSIS OF CLINICAL TRIALS

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While the value of information (VoI) methods have been developed for model based cost-effectiveness analyses (CEA), there is a gap in applying such methods to CEAs conducted alongside clinical trials. In the present it is shown that by treating the probability distribution of net benefits within each trial arm as a random quantity, calculations for the Expected Value of Sample Information (EVSI) for model-based CEAs can be extended to the setting of a trial-based CEA where individual net benefits from subjects are available. In this case EVSI calculates the expected return of investment from conducting a future trial with the similar design as a function of its sample size. Based on such analogy, a nonparametric method for EVSI calculation based on two-level bootstrap is introduced. At the first level, a Bayesian bootstrap (Rubin, 1981) from the vector of individual-level net benefits within each arm of the trial is performed. The empirical distribution of such a bootstrap sample amounts to a random draw from the 'posterior distribution of the distribution' of net benefits given the observed data. A second bootstrap from this sample then models the distribution of net benefits in the future study. The data of the future and current trials will be combined to identify the maximum net benefit and the cycle is repeated over several iterations. We also extend this framework to address parametric analysis (e.g., net benefit regression), missing values, and incorporation of external evidence. We use data from a randomized clinical trial of combination therapy in COPD as an application. Since the two-level bootstrap directly generates samples of the individual-level data for the future trial, it allows modeling realistic scenarios (e.g., missing values, complex statistical analysis). This, combined with the nonparametric nature of the method, should provide a robust framework for VoI analysis for trial-based CEAs.

MENTAL HEALTH – Clinical Outcomes Studies

PMH1

METABOLIC SYNDROME AND SECOND GENERATION ANTIPSYCHOTICS UTILIZATION—IMPACT OF PSYCHIATRIC COMORBIDITY AND POLYPHARMACY

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OBJECTIVES: Current studies examining metabolic effects associated with second generation antipsychotics (SGAs) do not consider the impact of psychiatric comorbidi-

ties or medications. This study aimed to determine the association of metabolic syndrome (MetS) and SGA use, and the incremental contributions of select psychiatric comorbidities and polypharmacy. **METHODS:** We applied descriptive and regression analyses to a large administrative claims database of antipsychotic users to examine the association between SGAs (aripiprazole, ziprasidone, risperidone, quetiapine, and olanzapine) and MetS, as well as the effects of psychiatric comorbidity and polypharmacy. Select psychiatric comorbidities included schizophrenia, bipolar, depression, and other psychiatric disorders. Psychiatric polypharmacy was defined as concomitant use of antipsychotics with other psychiatric drugs with metabolic effects (selective serotonin reuptake inhibitors [SSRIs], tricyclic antidepressants [TCAs], other antidepressants, and mood stabilizers). **RESULTS:** Of 50,128 antipsychotic users, the prevalence of MetS was lower in SGA users than non-SGA users (7.6% vs. 12.8%; $P < 0.0001$), who were older and had higher prevalence of MetS components. However, SGA users exhibited more indicators of psychiatric severity, as evidenced through higher prevalence of psychiatric disorders and higher concomitant use of other psychiatric drugs. Multivariable regression analysis showed the odds of MetS was lower in SGA users (OR = 0.86; $P < 0.001$) than non-SGA users. Concomitant use of SSRIs and TCAs significantly increased the odds of having MetS (OR = 1.26 and 1.29, respectively), as did diagnoses of schizophrenia, bipolar or depression disorders (OR = 1.22, 1.18, 1.12, respectively) (all $P < 0.001$). **CONCLUSIONS:** Psychiatric comorbidity and polypharmacy significantly increase the odds of MetS in antipsychotic users. Findings demonstrate the need for practitioners to consider patients' psychiatric comorbidity and polypharmacy burdens when prescribing SGAs. Results suggest that prescribers of SGAs may be aware of metabolic effects and therefore prescribe non-SGAs to their more metabolically-vulnerable patients. Further research into the complexities of treatment patterns and outcomes in this comorbid population is warranted.

PMH2

EARLY RESPONSE PREDICTS SUBSEQUENT RESPONSE TO OLANZAPINE LONG-ACTING INJECTIONS IN THE TREATMENT OF SCHIZOPHRENIA

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OBJECTIVES: Early nonresponse to oral antipsychotics was previously shown to be a robust predictor of subsequent nonresponse to continued treatment with the same medication in the treatment of schizophrenia. This study assessed whether early response or early nonresponse to treatment can serve as a clinical marker in the treatment of schizophrenia with an atypical antipsychotic in long-acting injection formulation (depot). **METHODS:** This post hoc analysis used data (n = 233) from an 8-week randomized, double-blind placebo-controlled study of olanzapine long-acting injection (olanzapine-LAI) in the treatment of inpatients with schizophrenia. Early response to olanzapine-LAI was defined as ≥30% improvement on the PANSS total score (scored 0–6) from baseline to 4 weeks of treatment. Subsequent response was defined as ≥40% improvement on the PANSS total score from baseline to endpoint. Predictive accuracy was assessed by calculating sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall predictive accuracy. Early responders and early non-responders to olanzapine-LAI were also compared on change in clinical and functional outcome measures. **RESULTS:** Early response/nonresponse to olanzapine-LAI, assessed following 4 weeks of treatment, predicted subsequent response/nonresponse with a high level of overall accuracy (79%), sensitivity (85%), specificity (72%), PPV (78%), and NPV (80%). Compared to early non-responders, early responders had significantly longer time to all-cause treatment discontinuation, greater symptom improvement at all time points (per PANSS total and subscale scores), and greater improvement in quality of life and level of social functioning (all at $P \geq 0.01$). **CONCLUSIONS:** In this study of inpatients with schizophrenia, early response to olanzapine long-acting injection was found to be a robust predictor of subsequent response to the medication. Early responders experienced significantly better clinical and functional outcomes compared to early non-responders and had longer treatment duration. Current findings are consistent with previous research on oral antipsychotics and will require replication in future studies.

PMH3

A MULTILEVEL ANALYSIS OF AREA AND INDIVIDUAL EFFECTS ON METHADONE MAINTENANCE TREATMENT IN TAIWAN

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OBJECTIVES: Many studies have shown that the methadone maintenance treatment (MMT) can effectively and safely reduce heroin use. However, most studies only evaluated and compared drug treatment programs, but did not investigate the influence of area of treatment on individual behaviors and treatment outcome. This study, therefore, aimed to evaluate direct effects of area-level characteristics and interactive effects of area-level characteristics and individual characteristics on Methadone maintenance treatment, after considering individual-level characteristics in Taiwan. **METHODS:** All opioid-dependent persons from five hospitals in 2009 who were participating in the outpatient methadone maintenance program for the first time and met eligibility criteria were enrolled into the study. The impact of MMT on self–perceived health status was assessed by the case manager of each hospital. Health status and treatment outcome were investigated at the first outpatient visit and at 3-month follow-ups. Individual level and area level characteristics were also assessed. Multilevel linear models were used to estimate if the differences of quality of life and opioid treatment index before and after the MMT were significant. **RESULTS:** A total of 330 opioid-dependent patients were recruited in the study. During the follow-up period, 38% of participants completed study (N = 127). The mean age of study participants was 35 years. Most of participants were male, single, low education level, unemployed and smoking. Patients under MMT had statistically significant improvements in total quality of life ($t = -4.293$, $P < 0.000$), opioid treatment index (OTI) ($t = 8.44$, $P < 0.000$), and the satisfaction of quality of life ($t = -4.498$, $P < 0.000$). Furthermore, our result indicated that the schizophrenic and older patients had significantly poorer results. In addition, area of treatment was also significantly associated with OTI. **CONCLUSIONS:** MMT improves the quality of life of patients and reduce drug abuse problems. However, actions should be taken to minimize the variations among areas of treatment.

PMH4

LABOR FORCE WITHDRAWAL OF PATIENTS WITH PSYCHIATRIC ILLNESS IN TAIWAN

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OBJECTIVES: This study aimed to estimate the withdrawal rate from the labor market among patients with schizophrenia or bipolar/depression in Taiwan. **METHODS:** The data source was the Psychiatric Inpatients Medical Claims Data (PIMC) from the National Health Research Institute (NHRI), Taiwan. The PIMC compiled all the health records during 1996–2008 for patients who had at least one psychiatric hospitalization during 1996–2001. The inclusion criteria were patients who: 1) had their initial psychiatric health record within 1998 to 2001; 2) had primary or secondary ICD-9-CM diagnosis of schizophrenia, bipolar or depression; 3) were under employment; and 4) were aged between 18 and 65. The final sample available for the analyses was 23,174 (11,970 for schizophrenia; 11,204 for bipolar/depression). An index date was created by subtracting 365 days from the date of initial health record for examining the impact of the disease on withdrawal pre and post of disease onset. To identify all withdrawal events, each case was tracked from the index date until December 31, 2008 or death, whichever came first. Women without events were censored on December 31, 2008. Kaplan–Meier method was used to estimate cumulated employment rates. **RESULTS:** For patients with schizophrenia, withdrawal rate of 34% was found during 1 year before the disease onset. During 1 year before and one after the disease onset, the withdrawal rate increased to 52%. During 1 year before and 4 years after the disease onset, the rate raised to 78%. Similar patterns were observed for patients with bipolar/depression, with the corresponding rate equaling 34%, 52%, and 75%. Median employment time (95% CI) was 672.0 days (645.0, 698.0) for patients with schizophrenia, and 689.5 days (662.0 to 712.0) for patients with bipolar/depression. **CONCLUSIONS:** Schizophrenia, bipolar and depression were showed to have adverse impacts on labor participation.

MENTAL HEALTH – Cost Studies

PMH5

A DIRECT MEDICAL COST ANALYSIS OF GEROPSYCHIATRIC PATIENTS IN TAIWAN

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OBJECTIVES: The aims of this study are to estimate the direct medical costs and utilization rate of psychiatric services among elder people (aged 65 and over) in Taiwan, and to evaluate the costs of the top five geriatric mental disorders. **METHODS:** This study was based on the National Health Insurance Research Database of Taiwan's National Health Insurance (NHI) program. Detailed data was extracted from the Psychiatric Inpatient Medical Claim (PIMC) dataset. The PIMC included 96,013 psychiatric inpatients' data from 1996 to 2007. **RESULTS:** From 2002 through 2007, the sample included 15,109 (16% of all psychiatric inpatients) geropsychiatric inpatients. The total admissions were 19,137 and the hospitalization rate was 1.27 per person per year. The average LOS (length of stay) was 35.05 days (acute bed), 78.71 days (chronic bed), and average ambulatory visits were 9.48 per patient per year. The mean total hospital-related cost was USD 7.2 million and the mean cost for each patient was USD 2828 per year. The top five ranking mental disorders and their average costs per year were dementia (987 patients, USD 2.6 million), mood disorders (616, USD 1.6), schizophrenia (276, USD 1.0), other organic brain disorders (254, USD 0.6), and delusional disorders (149, USD 0.9). **CONCLUSIONS:** From 2002 through 2007, the direct medical costs and utilization rate of psychiatric facilities by geropsychiatric inpatients increased annually in Taiwan. The direct medical costs of dementia, mood disorder and schizophrenia were significantly higher than those of the other mental disorders. The direct medical expenditures estimated in this study have implications for assessment of financial impact on future insurance budget planning in Taiwan.